

36J.P147 Div. I

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
:)
VICTOR OSTROMOUKHOV)
:)
Application No.: Not Yet Assigned)
:)
Filed: Herewith)
:)
For: HALFTONING BY ENHANCED)
ERROR DIFFUSION : December 21, 2001

Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT
AND
INFORMATION DISCLOSURE STATEMENT

Sir:

Prior to examination, please amend the above-identified divisional
application, as follows:

IN THE SPECIFICATION:

Before the first line, please insert --This application is a division of U.S.

Application No. 09/184,551, filed November 2, 1998.--

IN THE CLAIMS:

Please cancel Claims 1 to 9 and 15 to 21 and amend Claims 24 to 26 as shown in the attached Appendix. The claims, as pending in the subject application, read as follows:

10. (Unamended From Previous Version) A method for halftoning image data for each of plural pixels, comprising the steps of:

selecting one of plural threshold masks based on intensity of the image data for a target pixel plus an accumulated error;

determining a halftone output value for the target pixel based on a comparison between a threshold in the selected threshold mask and the image data plus accumulated error for the target pixel; and

diffusing error between the halftone output value and the image data plus accumulated error for the target pixel, the error being diffused to pixels adjacent the target pixel;

wherein each thresholding mask has only a limited number of threshold values, with each different one of the plural threshold masks being provided for a different segment of the input intensity range.

11. (Unamended From Previous Version) A method according to Claim 10, wherein a separate threshold mask is provided for each and every input intensity value.

12. (Unamended From Previous Version) A method according to Claim 10, wherein the spread of values in each threshold mask varies based on its corresponding intensity level.

13. (Unamended From Previous Version) A method according to Claim 12, wherein the spread increases at each intensity range corresponding to formation of artifacts.

14. (Unamended From Previous Version) A method according to Claim 13, wherein at intervening non-integral fractions of the intensity range, the spread is reduced.

22. (Unamended From Previous Version) A method for halftoning image data for each of plural pixels, comprising the steps of:

determining a halftone output value for a target pixel based on a comparison between a threshold and the image data plus accumulated error for the target pixel;

diffusing error between the halftone output value and the image data plus accumulated error for the target pixel;

wherein error is diffused according to error diffusion weights provided for each different segment of the range of input intensities including a segment at a mid-tone segment.

23. (Unamended From Previous Version) A method according to Claim 22, wherein weights in the mid-tone segments are selected so as to decrease the tendency of the error diffusion process to form regular checkerboard patterns.

24. (Amended) An apparatus for halftoning image data for each of plural pixels, said apparatus comprising means for performing the functions specified in any of Claims 10 to 14 and 22 to 23.

25. (Amended) An apparatus for halftoning image data for each of plural pixels, comprising:

a program memory for storing process steps executable to perform a method according to any of Claims 10 to 14 and 22 to 23; and

a processor for executing the process steps stored in said program memory.

26. (Amended) Computer-executable process steps stored on a computer readable medium, said computer-executable process steps for halftoning image data for each of plural pixels, said computer-executable process steps comprising process steps executable to perform a method according to any of Claims 10 to 14 and 22 to 23.

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 C.F.R. § 1.56, Applicants respectfully direct the Examiner's attention to the documents listed below and on the enclosed Form PTO-1449.

1002591210001

U.S. Patent 5,251,023
U.S. Patent 5,276,535
U.S. Patent 5,337,087
U.S. Patent 5,422,742
U.S. Patent 5,438,431
U.S. Patent 5,535,020
U.S. Patent 5,557,709
U.S. Patent 5,673,121
U.S. Patent 5,684,932
U.S. Patent 5,687,303
U.S. Patent 5,696,602
U.S. Patent 5,701,366
U.S. Patent 5,737,453
U.S. Patent 5,796,435
U.S. Patent 5,799,108

PCT WO 95/27365

V. Ostromoukhov, et al., "Artistic Screening", Computer Graphics Proceedings, SIGGRAPH '95, pp. 219-228.

V. Ostromoukhov, et al., "Two Approaches in Scanner-Printer Calibration: Colorimetric Space-Based vs. 'Closed-Loop'", Proceedings of the SPIE - The International Society of Optical Engineering, Vol, 2170, 1994, pp; 133-142.

V. Ostromoukhov, et al., "Rotated Dispersed Dither: A New Technique For Digital Halftoning", Proceedings of the 21st International SIGGRAPH Conference, July 1994, pp. 123-130.

V. Ostromoukhov, "Hermite Approximation For Offset Curve Computation", IFIP Transactions B (Applications in Technology), Vol. B-9, 1993, pp. 189-196.

V. Ostromoukhov, "Reproduction Couleur Par Trames Irregulieres Et Semi-Regulieres", 1995.

P. Emmel, et al., "A grid-based method for predicting the behaviour of colour printers", Proceedings of the Third IS&T/SID Color Imaging Conference, 1995, pp. 71-77.

I. Amidror, et al., "Spectral Analysis and Minimization of Moire Patterns in Color Separation", Journal of Electronic Imaging, Vol. 3, No. 3, July 1994, pp. 295-317.

These documents were cited in prior parent Application No. 09/184,551 and might be deemed pertinent for the reasons given there. The Examiner is respectfully directed to the Patent and Trademark Office files for review of these documents. See MPEP § 609. Additionally, the Examiner is requested to indicate that this information has been considered by initialing the appropriate portion of the attached form PTO-1449.

CONCLUSION

Applicant's undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should be directed to our below listed address.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

24. (Amended) An apparatus for halftoning image data for each of plural pixels, said apparatus comprising means for performing the functions specified in any of Claims 10 to 14 and 22 to 23 [1 to 23].

25. (Amended) An apparatus for halftoning image data for each of plural pixels, comprising:

a program memory for storing process steps executable to perform a method according to any of Claims 10 to 14 and 22 to 23 [1 to 23]; and

a processor for executing the process steps stored in said program memory.

26. (Amended) Computer-executable process steps stored on a computer readable medium, said computer-executable process steps for halftoning image data for each of plural pixels, said computer-executable process steps comprising process steps executable to perform a method according to any of Claims 10 to 14 and 22 to 23 [1 to 23].